3D virtual geology field trips

Conference or Workshop Item

3D Virtual Geology Field Trip

The Open University

Dr Shailey Minocha
email: shailey.minocha@open.ac.uk
Second Life: Shailey Garfield

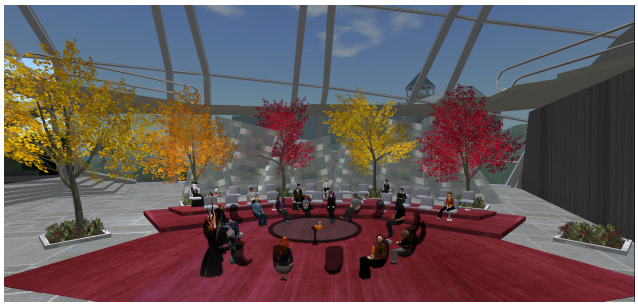
Being in Second Life

- enjoyable
- sense of presence, co-presence
- sense of engagement
- collaborative learning
- contextual learning

Projects in Second Life

- socialisation
- team working in distributed teams
- design of 3D learning spaces
- navigation and wayfinding in 3D learning spaces

Institutional perspective



- software not owned by us
- control
- availability
- not perceived for education alone

Funding came through in 2012

- Chose virtual Geology trip as the candidate App for development
- Compared: Unity 3D, Open Sim, Second Life
- Chose Unity 3D as the platform
  - browser-based App
  - stand-alone App and not a part of a social world

3D Virtual Geology Fieldtrip

- scope to demonstrate interactivity, sense of being there
- realism and high degree of fidelity
- visual and spatial experience not constrained by a ‘flat’ 2D user interface
- helps internalise the sense of exploration

Field trips in our institution

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- real field trips two or three times a year (tutor-led)
- DVD to facilitate reflection and activities
- DVD also helpful for students who are unable to go for real field trips

Lake District in the UK

- Skiddaw field area
- 6 sites (site 1 in Phase 1 of the project)
- Skiddaw group of rocks: sandstone, slates, granite
- Geological significance
  - how metamorphism varies in the Skiddaw group sedimentary rocks due to the intrusion of the Skiddaw granite
  - how the Skiddaw group rocks deformed during the mountain-building event

Video Part 1 (what to look for?)

- audio and textual guidance (tutor-led)
  - introduction
  - Geology of the area
  - instructions for learning activities
- choice of avatars
- choosing equipment for the field trip
- list of learning activities
- using the compass, sketch points and sketching

3D Virtual Geology Fieldtrip App

- Realism
  - design of the environment or landscape
    - LIDaR data
    - Photogrammetry data
    - 3D modeling to weave it together
  - learning activities (similar to a real field trip)
    - choosing the equipment, learning to use the compass, sketching rocks

Video Part 2 (what to look for?)

- student investigates grain composition of one rock
- overlaying maps on the landscape
  - ordnance survey map
  - Geology map
- cross-section of the mountains
  - showing the rocks (geology) underneath
- different views in each of the contexts
  - overhead, North-East, North-West, etc.

3D Virtual Geology Field Trip App

- Non-realism (things you can't do in a real field trip)
  - microscopic views of rocks within the environment
  - draping maps on the landscape
  - cutaways into the mountainside to see the geology underneath

Opportunities for students and educators

- practice/training for real life field trips
- reflect on your experiences of real field trips
- fly across the landscape
- additional field trip to a real field trip
- could replace a real field trip if resources are limited

Limitations: student learning and experiences

- risk awareness skills
- challenges of being outdoors
- challenges posed by the weather
- challenges of using the equipment in real life
- bonding with other students

Challenges of 3D virtual field trips

- costs involved in design, development and evaluation
- multi-skilled team and specialist developers are required
- student training
- overcoming the (negative) perceptions that people have about virtual field trips
- how best to communicate that virtual field trips are not being proposed to replace real field trips

For further conversations

- Shailey Garfield (Second Life)
- Email:

  shailey.minocha@open.ac.uk
- Profile:
  http://uk.linkedin.com/in/shaileyminocha
- Publications:

  http://oro.open.ac.uk/view/person/sm577.html